

REMARKS/ARGUMENTS

This paper is in response to the Office Action dated November 12, 2009, wherein Claims 23-25 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,734,289 to Khudoshin; Claims 1-3, 6-11, 14-18, and 20-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Khudoshin; Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Khudoshin in view of U.S. Patent No. 5,994,883 to Liu; and Claims 5 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Khudoshin. Applicant notes with appreciation the Examiner's indication that Claims 12 and 13 would be allowable if rewritten in independent form including all of the recitations of the base claims and any intervening claims. In response, Applicant has amended independent Claim 1 to include the recitations of original Claims 12 and 13, as well as the recitations of intervening original Claims 7 and 8. Applicant has made similar amendments to independent Claims 17 and 23. As a result of the amendments, Applicant has canceled Claims 7, 8, 12, and 13. Applicant respectfully submits that the remaining pending Claims 1-6, 9-11, and 14-25 are in condition for allowance. The Examiner's further consideration of this application is requested in light of the amendments made above and the following comments.

The present invention comprises a system and various methods for controlling and triggering a TRIAC device by generating a pulse at the gate of the TRIAC based on a comparison of a voltage limit value and a voltage measured at the gate. Claim 1 has been amended to recite that the voltage measured at the gate is applied to a comparator by means of a resistive divider formed by resistors of the same value. Claims 17 and 23 contain similar amendments. The resistive divider allows the use of simple hardware, combined with a single comparator, capable of implementing a voltage detection unit as a low cost device. This voltage detection unit supports a dynamic trigger of the TRIAC based on the present load. In contrast, Khudoshin only supports a static trigger of the TRIAC. That is, regardless of load, the threshold detector of Khudoshin is limited to triggering the TRIAC when the TRIAC gate voltage "is between two predetermined thresholds of opposite polarity." (Khudoshin, Col. 1, lines 46-49).

Due to the static trigger, Khudoshin is susceptible to failures that the present invention avoids. Static triggers rely on predetermined voltage thresholds, which lead to unpredictable time durations from threshold detection to zero crossing when the load current varies. As the load current increases, the time duration between threshold detection and zero crossing decreases, and vice versa. If the time duration is too short, the system will have insufficient time to trigger actuation of the TRIAC prior to the zero crossing. Alternatively, if the time duration is too long, the pulse used to actuate the TRIAC may have completed prior to the zero crossing. In either of these instances, the system described in Khudoshin will fail. Using a dynamic trigger, as in the present invention, allows a system to avoid these failures. By dynamically changing the voltage thresholds based on the present load, the time duration from threshold detection to zero crossing can be controlled in a predictable manner. Thus, the Applicant submits that the present application is patentably distinct from Khudoshin.

Additionally, the Office Action states that it would have been obvious to include an adjustable gate in Khudoshin since the provision of adjustability involves only routine skill in the art. Applicant submits, however, that the present invention goes beyond simply replacing a gate with an adjustable gate. In fact, the claims recite adjusting gate voltage limit values, not possessing an adjustable gate. The present invention discloses a system and methods for controlling and triggering a TRIAC that dynamically changes voltage thresholds, and is not an obvious substitution of a fixed part with an adjustable part. Rather, a number of components operate interactively to dynamically adapt the thresholds based on the current load on the system. It is not only that the trigger itself is adjustable, but that the trigger dynamically adjusts itself. This novel feature is not contemplated in Khudoshin.

The Applicant has made significant contributions to the art which are neither taught nor suggested by the cited prior art. Accordingly, it is submitted that the application is now in condition for allowance and such action is respectfully submitted. Should the Examiner have any questions, comments or proposed claim amendments, he is encouraged to contact the undersigned by telephone so that allowance of this application can be expedited.

Appl. No.: 10/595,931
Amdt. dated 02/11/2010
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The patentability of the independent claim has been argued as set forth above and thus the Applicant will not take this opportunity to argue the merits of the rejection with regard to the dependent claims. However, the Applicant does not concede that the dependent claims are not independently patentable and reserves the right to argue the patentability of the dependent claims at a later date if necessary.

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It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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ELECTRONICALLY FILED USING THE EFS-WEB ELECTRONIC FILING SYSTEM OF THE UNITED STATES PATENT & TRADEMARK OFFICE ON February 11, 2010.